

Listing of the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

Claim 1 (currently amended): A Pol I type *Thermotoga neapolitana* DNA polymerase comprising a modification that increases or enhances fidelity, wherein said modification comprises:

~~amino acid position Arg722 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Asn, Asp, Cys, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Ser, Thr, Tyr, and Val, or~~

~~amino acid position Lys726 of a said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val, or~~

amino acid positions Arg722 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val and Lys726 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, ~~Lys~~, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val, or

amino acid positions Arg722 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val and Phe730 of said *Thermotoga neapolitana*

polymerase substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Pro, Ser, Thr, Trp, Tyr, and Val.

Claim 2 (currently amended): A Pol I type *Thermotoga neapolitana* DNA polymerase comprising a modification that reduces or eliminates misincorporation of nucleotides during nucleic acid synthesis, wherein said modification comprises:

~~amino acid position Arg722 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Asn, Asp, Cys, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Ser, Thr, Tyr, and Val, or~~

~~amino acid position Lys726 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val, or~~

amino acid positions Arg722 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val and Lys726 of a *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, ~~Lys~~, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val, or

amino acid positions Arg722 of a *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val and Phe730 of said *Thermotoga neapolitana* polymerase substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Pro, Ser, Thr, Trp, Tyr, and Val.

Claims 3-5 (cancelled)

Claim 6 (previously presented): The polymerase of claim 1 or 2, further comprising one or more modifications to reduce or eliminate one or more activities selected from the group consisting of:

- (a) the 3'→5' exonuclease activity of the polymerase;
- (b) the 5'→3' exonuclease activity of the polymerase; and
- (c) the discriminatory activity against one or more dideoxynucleotides.

Claim 7 (previously presented): The polymerase of claim 1 or claim 2, wherein said polymerase is modified to reduce or eliminate 3'→5' exonuclease activity.

Claim 8 (previously presented): The polymerase of claim 1 or claim 2, wherein said polymerase is modified to reduce or eliminate discriminatory activity against one or more dideoxynucleotides.

Claim 9 (previously presented): The polymerase of claim 1 or claim 2, wherein said polymerase is modified to reduce or eliminate 5'→3' exonuclease activity.

Claims 10-13 (cancelled)

Claim 14 (previously presented): The polymerase of claim 1 or claim 2, wherein Arg722 is substituted with an amino acid selected from the group consisting of Asn, Asp, Cys, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Ser, Thr, Tyr and Val.

Claims 15-16 (cancelled)

Claim 17 (previously presented): The polymerase of claim 1 or claim 2, wherein Lys726 is substituted with an amino acid selected from the group consisting of Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val.

Claims 18-19 (cancelled)

Claim 20 (previously presented): The polymerase of claim 1 or claim 2, wherein Arg722 is substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val, and wherein Lys726 is substituted with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val.

Claims 21-36 (cancelled)

Claim 37 (previously presented): A kit for amplifying, synthesizing, or sequencing a DNA molecule comprising one or more of the modified polymerases of claim 1 or claim 2.

Claim 38 (original): The kit of claim 37, further comprising one or more dideoxyribonucleoside triphosphates.

Claim 39 (original): The kit of claim 37, further comprising one or more deoxyribonucleoside triphosphates.

Claim 40 (original): The kit of claim 38, further comprising one or more deoxyribonucleoside triphosphates.

Claims 41-68 (cancelled)

Claim 69 (previously presented): The polymerase of claim 14, wherein Arg722 is substituted with an amino acid selected from the group consisting of Lys, His, Asn, Tyr, and Leu.

Claim 70 (cancelled)

Claim 71 (previously presented): The polymerase of claim 1 or claim 2, wherein Arg722 is substituted with an amino acid selected from the group consisting of Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr and Val, and Phe730 is substituted

with an amino acid selected from the group consisting of Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Pro, Ser, Thr, Trp, Tyr and Val.

Claim 72 (previously presented): The polymerase of claim 71, wherein Arg722 is substituted with an amino acid selected from the group consisting of Lys, Gln, His, Asn, Tyr, and Leu.

Claim 73 (previously presented): The polymerase of claim 71, wherein Phe730 is substituted with Tyr.

Claim 74 (previously presented): The polymerase of claim 71, wherein Arg722 is substituted with an amino acid selected from the group consisting of Lys, Gln, His, Asn, Tyr, and Leu, and Phe730 is substituted with Tyr.

Claim 75 (previously presented): The polymerase of claim 17, wherein Lys726 is substituted with Arg.

Claims 76-82 (cancelled)